PATENT ABSTRACTS OF JAPAN

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(72) Inventor: **HASEGAWA KAZUHIDE**

(54) **PRINTING SYSTEM HAVING HISTORY FUNCTION**

(57) Abstract:

PROBLEM TO BE SOLVED: To make storable the history of periodic replacement of parts and parts replaced because of a fault inside a printing system by providing a history preserving means to hold the counted value of a service life counter and an accumulated replacement counter on the replaced parts at the time of replacement.

SOLUTION: At the time of detecting the replacement of a part, a part ID is read out from the replaced part. The part ID is previously set for every part and stored in a data ROM 13c. According to the part ID read out, the value of the service life counter is read out from an NVRAM in a memory 19 and written in a table defined in an external memory 14. The value of the accumulated replacement counter on the part in the table is updated and the value of the service life counter in the NVRAM is reset. In the case of replacing the part due to an error, a flag showing the replacement due to the error is written in the table defined in the external memory 14 together with the values of the service life counter and the accumulated replacement counter according to the ID of every part.
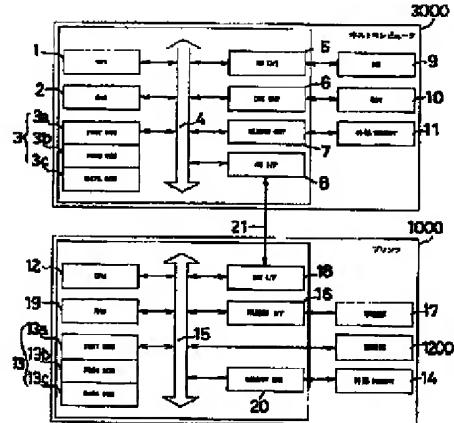
* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1]In an exchangeable printing system for every parts by which needed exchange of periodical parts and unitization was carried out at the time of a fault occurrence, An identification device which identifies the individual originality of said replacement parts, a life counting means which counts and holds a life to exchange of said part, A printing system which has a history function possessing a history preserving means holding a life count and an accumulation exchange count at the time of exchange of an accumulation exchange counting means which counts said accumulated parts-replacement count, and each of said replacement parts.
[Claim 2]In an exchangeable printing system for every parts by which needed exchange of periodical parts and unitization was carried out at the time of a failure occurrence, An identification device which identifies the individual originality of said parts replacement, a life counting means which counts and holds a life to exchange of said part, An accumulation exchange counting means which counts said accumulated parts-replacement count, A printing system which has a history function possessing a history preserving means holding a life count, an accumulation exchange count, and a factor at the time of exchange of an error status memory measure holding a factor at the time of exchange of said part, and each of said replacement parts.
[Claim 3]A history reading means which reads said accumulation exchange count currently held at said history holding means, A life count reading means which reads a life count of multiple times, a comparison judging means which performs comparison with said life count and a threshold which were read, 2 is [Claim 1 possessing a message indicator means to display a message which announces a parts replacement beforehand based on this result by which the comparison test was carried out, and] a printing system which has a history function of a description either.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to an exchangeable printing system for every parts by which needed exchange of periodical parts and unitization was carried out at the time of a fault occurrence.
[0002]
[Description of the Prior Art]Conventionally, it was identifiable by the counter (value) set up beforehand in the exchange time of the components needing periodic replacement in this kind of printing system. A toner cartridge, a photoconductive drum, etc. were easily exchangeable without work special at the time of a certain fault occurrence about the parts by which unitization is carried out.
[0003]
[Problem(s) to be Solved by the Invention]However, if it was in the above-mentioned conventional example, about the history of the exchange for every user environment, such as a portion which the replacement frequency of parts and an obstacle tend to generate, it had to leave record separately. Then, this invention aims at offer of the means for memorizing the history of the parts for which it was exchanged by components needing periodic replacement or an obstacle inside the printing system.
[0004]
[Means for Solving the Problem]For this reason, in this invention, it is going to attain said purpose by providing a printing system which has a history function of a description in either of each following item (1) – (3).
[0005](1) In an exchangeable printing system for every parts by which needed exchange of periodical parts and unitization was carried out at the time of a fault occurrence, An identification device which identifies the individual originality of said replacement parts, a life counting means which counts and holds a life to exchange of said part, A printing system which has a history function possessing a history preserving means holding a life count and an accumulation exchange count at the time of exchange of an accumulation exchange counting means which counts said accumulated parts-replacement count, and each of said replacement parts.
[0006](2) In an exchangeable printing system for every parts by which needed exchange of periodical parts and unitization was carried out at the time of a failure occurrence, An identification device which identifies the individual originality of said parts replacement, a life counting means which counts and holds a life to exchange of said part, An accumulation exchange counting means which counts said accumulated parts-replacement count, A printing system which has a history function possessing a history preserving means holding a life count, an accumulation exchange count, and a factor at the time of exchange of an error status memory measure holding a factor at the time of exchange of said part, and each of said replacement parts.
[0007](3) A history reading means which reads said accumulation exchange count currently held at said history holding means, A life count reading means which reads a life count of multiple

times, a comparison judging means which performs comparison with said life count and a threshold which were read, The above (1) possessing a message indicator means to display a message which announces a parts replacement beforehand based on this result by which the comparison test was carried out, and (2) paragraphs are the printing systems which have a history function of a description either.
[0008]
[Function]By the above this invention composition, the history of :(1) each replacement parts from which the following operation/effect are acquired, respectively is recordable on the inside of a printing system.
[0009](2) The history of the parts for which it was exchanged by each replacement parts and an obstacle is recordable on the inside of a printing system.
[0010](3) The notice message of a parts replacement can be expressed by user environment as the optimal timing.
[0011]
[Embodiment of the Invention]An embodiment of the invention is described in detail with reference to Drawings based on two or more working example below.
[0012]
[Example](Working example 1) The 1st working example of the printing system of this invention is described. The printer of this example 1 is a laser beam printer, it is connected to a host computer and the laser beam printer constitutes the printing system.
[0013]<Composition of a laser beam printer> The composition of a laser beam printer is explained. Drawing 1 is a sectional view showing the internal structure of a laser beam printer (henceforth "LBP"). LBP of this example can perform registration of a character pattern, and registration of a fixed form form (form data) with the data resources which are not illustrated.
[0014]In drawing 1, 1000 is a LBP main part, and input and memorize text (character code), form information, or a macroinstruction supplied from the host computer 3000 (refer to below-mentioned drawing 2) connected outside, and. A character pattern, a form pattern, etc. corresponding according to those information are created, and an image is formed in the record paper which is a recording medium.
[0015]The navigational panel in which, as for 1200, an operation switch, a LED display device, etc. were allocated, and 1100 are printer controllers which analyze the text etc. which are supplied from control and said host computer 3000 of the LBP1000 whole. This printer controller 1100 changes text into the corresponding video signal of a character pattern, and outputs it to the laser driver 1001.
[0016]The laser driver 1001 is a circuit which drives the semiconductor laser 1002. Turning on and off of the laser beam 1003 discharged from the semiconductor laser 1002 according to the inputted video signal is changed.

[0017]The laser beam 1003 is shaken at a longitudinal direction by the rotating polygon 1004, and scans the surface of the electrostatic (photo conductor) drum 1005. Thereby, the electrostatic latent image of a character pattern is formed in the surface of the electrostatic drum 1005. After this electrostatic latent image is developed with the development unit 1006 provided in the circumference of the electrostatic drum 1005, it is transferred by the recording form as a visible image.
[0018]A cut sheet is used for this recording form. The cut sheet recording form is stored by the paper cassette 1007 with which LBP1000 was equipped.
It is incorporated in a device by the feed roller 1008 and each transportation roller 1009-1010, and the electrostatic drum 1005 is supplied.

[0019]<Composition of a printer control system> Next, the composition of a printer control system is explained. Drawing 2 is a block diagram showing the composition of the printer control system which comprises a host computer and a printer.
[0020]In drawing 2, 3000 is the host computer mentioned above.
It has CPU1 which performs processing of a document in which a figure, an image, a character, a

table (a spreadsheet etc. are included), etc. were intermingled based on the document processing program etc. which were recorded on each ROM3.

CPU1 controls each device connected to the system bath 4 in the gross.

[0021]ROM3 has the storage area divided into ROM3a for a program, ROM3b for fonts, and ROM3c for data. The document processing program mentioned later is memorized, the font data etc. which are used in the case of the above-mentioned word processing are memorized by ROM3b for fonts, and the various data used for it when performing the above-mentioned word processing etc. to ROM3c for data is memorized at ROM3a for a program.

[0022]2 is RAM and functions as the main memory of CPU1, a work area, etc. 5 is a keyboard controller (KBC) and controls the keystroke from the keyboard (KB) 9 or an unillustrated pointing device. 6 is a CTR controller (CRTC) and controls the display of CRT display (CRT) 10.

[0023]7 is a disk controller (MC) and controls access with the external memory 11 which memorizes a boot program, various applications, font data, a user file, a compilation file, etc., such as a hard disk (HD) and a floppy disk (FD).

[0024]8 is a network interface circuit (NW I/F), and it is connected to other host computers and printers 1000 via the predetermined network 21, and it performs communications control with other devices of printer 1000 grade.

[0025]CPU1 performs deployment (rasterize) processing of the outline font to display information RAM set as RAM2, and it makes WYSIWYG on CRT10 possible.

[0026]CPU1 by the side of the host computer 3000 which has the above-mentioned composition opens various windows registered according to the command directed by the unillustrated mouse cursor etc. on CRT10, and it performs various data processing.

[0027]Access with various kinds of devices connected to the system bath 15 based on the control program memorized by the control program which 12 is CPU and was memorized in the printer 1000 on the other hand by ROM for a program of ROM13, or the external memory 14 is controlled in generalization, A picture signal is outputted to the printing department (printer engine) 17 connected via the printing department interface 16 as a print-out.

[0028]ROM13 has the storage area divided into ROM13b for a program, ROM13a for fonts, and ROM13c for data. The control program mentioned later is memorized by ROM13b for a program, and to ROM13a for fonts. The font data etc. which are used when generating the above-mentioned print-out are memorized, and when it is a printer without the external memory 14, such as a hard disk, the information etc. which are used on the host computer 3000 are memorized by ROM13c for data.

[0029]CPU12 can perform the host computer 3000, and other printers and communications processing via the network interface circuit 18, and can notify the information and resource data in a printer to the host computer 3000.

[0030]19 is RAM which functions as the main memory of CPU12, a work area, etc.

By option RAM connected to an unillustrated extension port, memory space is extensible. RAM19 is used for a print-out spread region, an environment data storing region, non-volatile RAM (NVRAM), etc.

[0031]The external memory 14 mentioned above, such as a hard disk (HD) and an IC card, has access controlled by the disk controller (MC) 20. It is connected as an option and the external memory 14 memorizes font data, an emulation program, form data, etc.

[0032]1200 is the navigational panel mentioned above in drawing 1.

An operation switch, a LED display device, etc. are allotted.

[0033]The external memory 14 mentioned above may be constituted so that not only one piece but two or more external memory which stored the program which interprets the printer control language with which it may have more than one and an option font card differs from a language system in addition to a built-in font can be connected. It has unillustrated NVRAM and may be made to memorize the printer mode setup information from the navigational panel 1200.

[0034]<Storage processing of exchange hysteresis information> In the printer control system constituted in this way, :drawing 3 explained about the processing sequence which saves the exchange hysteresis information of parts using the flow chart of drawing 3, It is a flow chart

·which shows the procedure which performs the writing to the table which reads a life counter from a part unit and is defined in the external memory 14 in the life counter (value) and the accumulation exchange counter (value) according to the originality (ID) for every parts.

[0035]Detection of exchange of parts will read part ID from the parts for which it was exchanged first (Step S101). This part ID is beforehand set up for every parts, and is memorized by ROM13c for data again.

[0036]The life counter is memorized for every part ID by NVRAM in the memory 19. According to read part ID, a life counter is read from NVRAM (Step S102). The writing to the table defined in the external memory 14 in the read life counter is performed (Step S103).

[0037]Next, the exchange counter with which the parts in a table were accumulated is updated. And the life counter in NVRAM is reset (Step S104).

[0038]Drawing 4 is an example holding the exchange history defined in the external memory 14 of a table. The life counter of the ten newest batches is recorded in this table. About the part exceeding 10 times, it is overwritten one by one to the old thing.

[0039]By the menu program beforehand memorized by program ROM13b in drawing 2, the table saved in this way can be checked by the final controlling element 1200, or can be printed. The utility for reading a table is prepared for the external memory 11 on the host computer 3000, and hysteresis information can also be checked from a remote place by network 21 course.

[0040]The printing system of (working example 2), next the 2nd working example of this invention is explained. In said 1st working example, although only the life counter for every part ID was recorded, since a certain obstacle occurred on that exchange of parts was performed by the periodical life, or parts, it is made to record at this example 2 also about the additional information of exchange having been performed.

[0041]When drawing 5 reads a life counter from a part unit, and the error condition in the printer 1000 at this time is checked and exchange is performed by generating of an error, It is a sequence flow chart which shows the procedure which writes the flag which shows exchange by error with a life counter and an accumulation exchange counter according to ID for every parts in the table defined in the external memory 14.

[0042]Detection of exchange of parts will read part ID from the parts for which it was exchanged first like said working example 1 (Step S101). Next, the error status information generated within the printer 1000 saved in RAM19 is read (Step S201).

[0043]It is judged whether the error which requires a parts replacement in the read status information continuously has occurred (Step S202). When the error has occurred, the information which shows exchange by error to the table defined in the external memory 14 is written in (Step S203).

[0044]Henceforth, in Step S104, read-out of a life counter, the writing to a table, and the update process of an accumulation exchange counter are performed like said working example 1 from Step S102.

[0045]Reset processing of the error status information finally saved in RAM19 is performed (Step S204).

[0046]Drawing 6 is an example holding the exchange history defined in the external memory 14 in this example 2 of a table. On this table, the failure mark is added with the life counter at the time of exchange by error.

[0047]The printing system of (working example 3), next the 3rd working example concerning this invention is explained. In this example 3, comparison with the threshold beforehand set to the difference of the life counter (value) of newest 2 batch currently written in in the table is performed, and it is made to make variable timing which displays the message of a parts replacement.

[0048]The accumulation exchange counter N is read from the table defined in the :external memory 14 (drawing 2) which explains a procedure sequence using the flow chart of drawing 7 (Step S301). If the accumulation exchange counter N is two or less, processing will be ended (Step S302), and if the accumulation exchange counter N is two or more, the newest life counter will be read first (Step S303).

[0049]Next, the life counter in front of one is read (Step S304), it ranks second and comparison with the difference of the threshold beforehand set as NVRAM in RAM19 and 2 times of life counters is performed (Step S305).

[0050]Setting out of a threshold can also be performed from the utility prepared for the external memory 11 on the final controlling element 1200 in drawing 2, and the host computer 3000. When difference is smaller than a threshold, a counter until it displays the exchange notice message set up in NVRAM is updated.

[0051]When close to actual exchange time, the message of an exchange advance notice comes to be displayed by the above.

[0052]

[Effect of the Invention]As mentioned above, as explained, according to this invention, each following effect is acquired, respectively. Namely, the identification device which identifies individual ID of said replacement parts according to the printing system concerning (1) Claim 1, The life counting means which counts and holds the life to exchange of said part, Since the history preserving means holding the life count and accumulation exchange count at the time of exchange of the accumulation exchange counting means which counts said accumulated parts-replacement count, and each of said replacement parts is provided, the history of replacement parts is recordable on the inside of a printing system.

[0053](2) The identification device which identifies individual ID of said parts replacement according to the printing system concerning Claim 2, The life counting means which counts and holds the life to exchange of said part, The accumulation exchange counting means which counts said accumulated parts-replacement count, Since the history preserving means holding the life count, accumulation exchange count, and factor at the time of exchange of the error status memory measure holding the factor at the time of exchange of said part and each of said replacement parts is provided, The history of the parts for which it was exchanged by components needing periodic replacement and an obstacle is recordable on the inside of a printing system.

[0054](3) According to the printing system concerning Claim 3, it has the processing means according to claim 1 or 2, The history reading means which reads said accumulation exchange count currently held at said history holding means, The life count reading means which reads the life count of multiple times, the comparison judging means which performs comparison with said life count and threshold which were read, Since a message indicator means to display the message which announces a parts replacement beforehand based on this result by which the comparison test was carried out is provided, the notice message of a parts replacement can be expressed by user environment as the optimal timing.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The internal structure sectional view of the laser beam printer of working example
[Drawing 2]The configuration block figure of a printer control system
[Drawing 3]The storage processing sequence flow chart of the exchange hysteresis information
of parts
[Drawing 4]An example of an exchange history holding table
[Drawing 5]The writing processing sequence flow chart to the table of working example 2
[Drawing 6]An example of the exchange history holding table of working example 2
[Drawing 7]The variable processing sequence flow chart of the exchange notice message display
timing of working example 3
[Description of Notations]
12 CPU
17 Printing department
21 Network
1000 Laser beam printer (main part)
1200 Navigational panel
3000 Host computer

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DRAWINGS

[Drawing 4]

交換履歴保持テーブル の 一例

[Drawing 1]

実施例のレーザビームプリンタの内部構造断面図
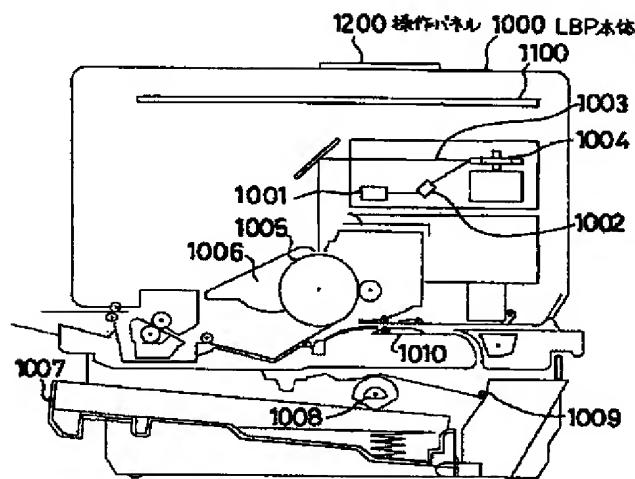
[Drawing 6]

実施例2の交換履歴保持テーブルの一例

部品ID	累積(交換)カウンタ	交換カウンタ									
		1	2	3	4	5	6	7	8	9	10
シアントナー	4	2450	3467 故障	3640	3242						
マゼンタトナー	1	3624									
イエロートナー	2	3500	3833								
ブラックトナー	15	3855	3657	3940	3877	2988	3675	3844	3967	3640	3855
ドラムカートリッジ	1	8842 故障									
中間転写体	1	8540									
給紙ローラユニット	0										
搬送ローラユニット	0										

[Drawing 2]

プリンタ制御系の構成ブロック図
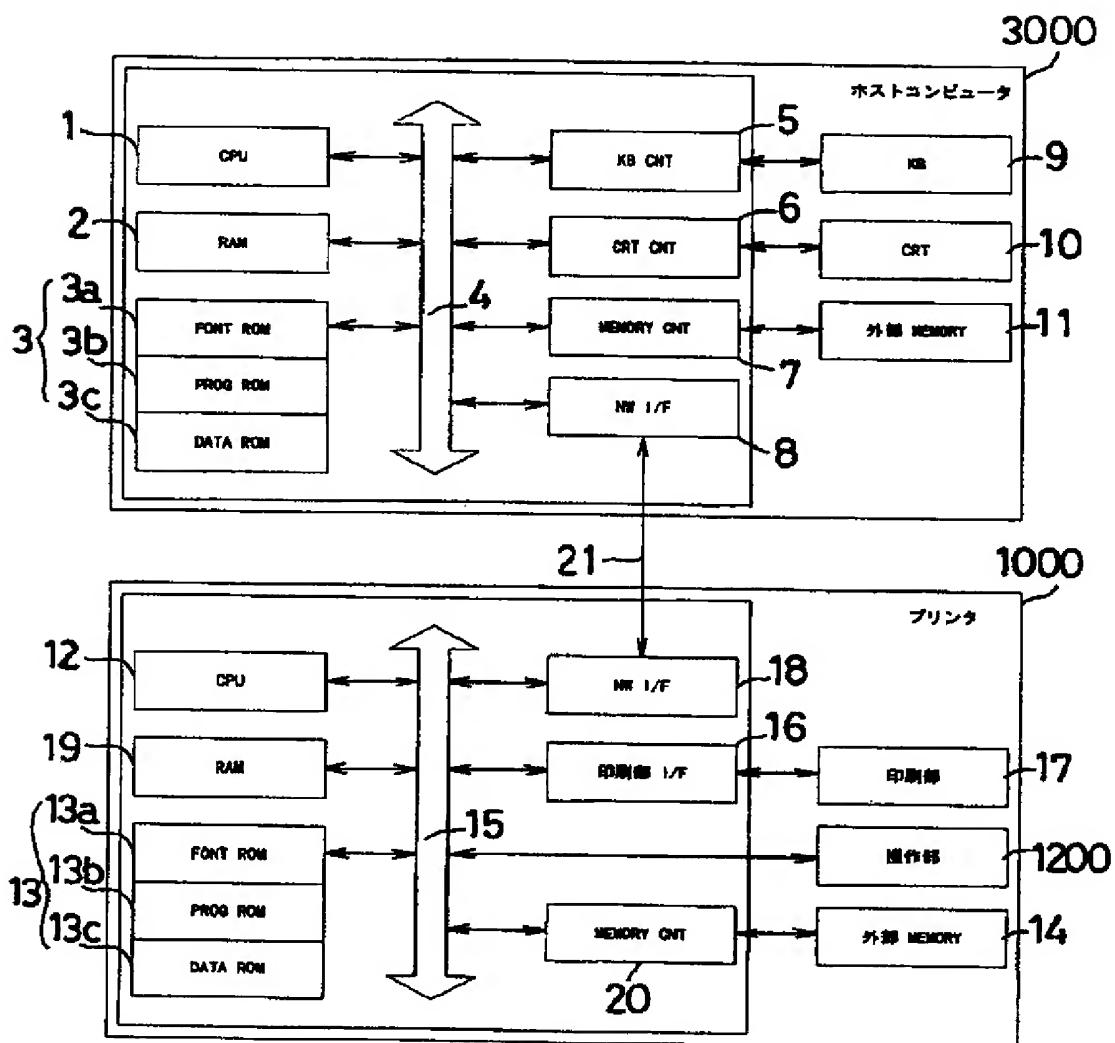
[Drawing 3]

部品の交換履歴情報の保存処理シーケンス フローチャート

```
        ┌──────────────┐
        (   処理開始    )
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐     ステップ
        │ 部品ID 読み出し │ ～ S101
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐
        │ 寿命カウンタ読み出し │ ～ S102
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐
        │ 寿命カウンタ書き込み │ ～ S103
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐
        │ 累積交換カウンタ更新 │ ～ S104
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐
        (   処理終了    )
        └──────────────┘
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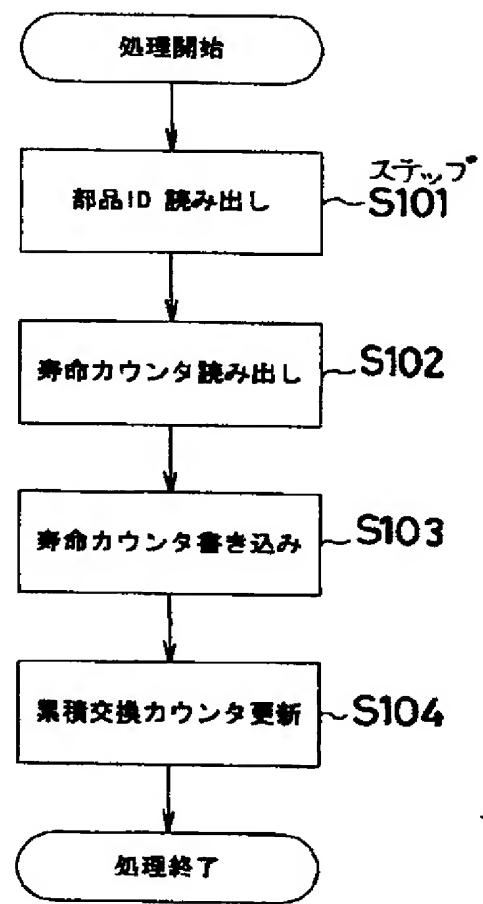
[Drawing 5]

実施例2のテーブルへの書き込み処理シーケンス フローチャート

```
         ┌──────────────┐
         │   処理開始    │
         └──────────────┘
                │
         ┌──────────────┐     ステップ
         │ 部品ID 読み出し │ ～ S101
         └──────────────┘
                │
         ┌──────────────┐
         │ エラーステータス │ ～ S201
         │   読み出し     │
         └──────────────┘
                │
              S202                      S203
            ◇────────◇  いいえ  ┌──────────────┐
            │ 定期交換? │────────→│ エラーステータス │
            ◇────────◇         │   書き込み     │
                │ はい          └──────────────┘
                │←─────────────────────┘
         ┌──────────────┐
         │ 寿命カウンタ 読み出し │ ～ S102
         └──────────────┘
                │
         ┌──────────────┐
         │ 寿命カウンタ 書き込み │ ～ S103
         └──────────────┘
                │
         ┌──────────────┐
         │ 累積交換カウンタ 更新 │ ～ S104
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                │
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         │   処理終了    │
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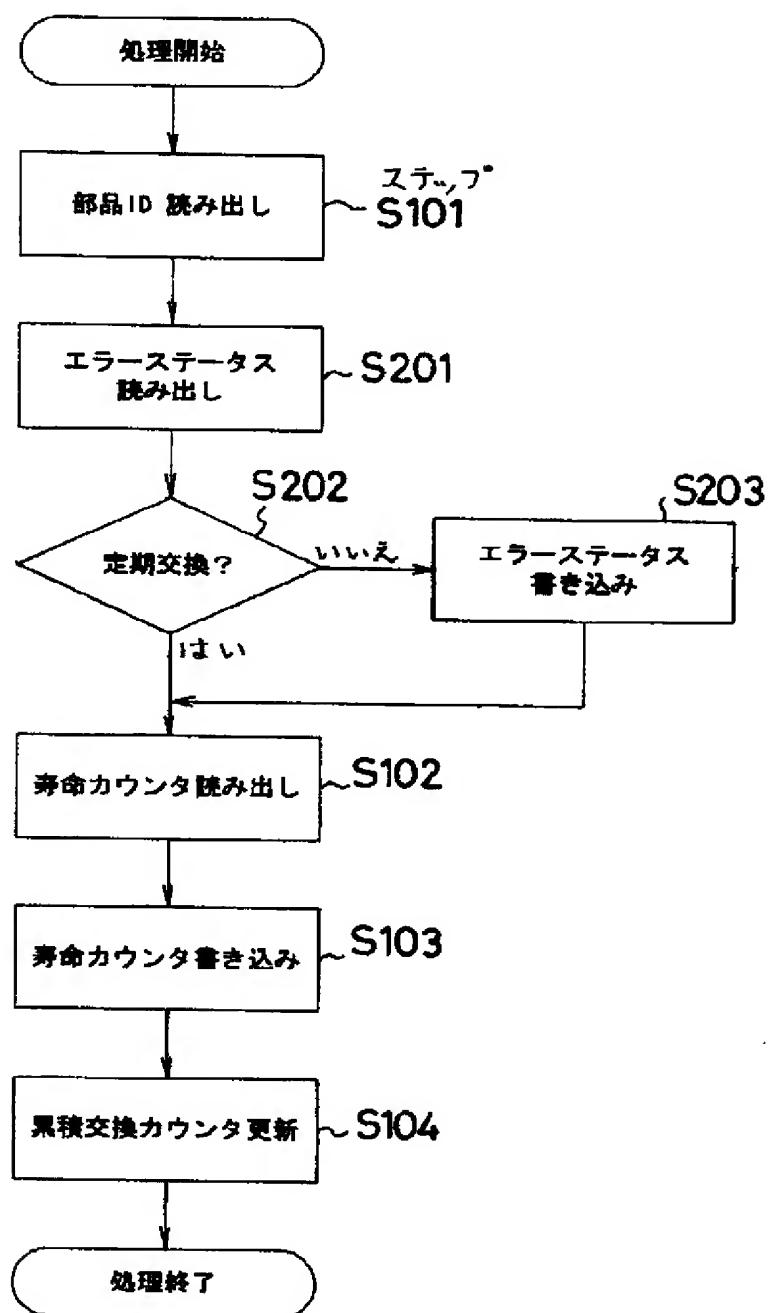
[Drawing 7]

実施例3の交換予告メッセージ表示タイミングの可変処理
シーケンス フローチャート
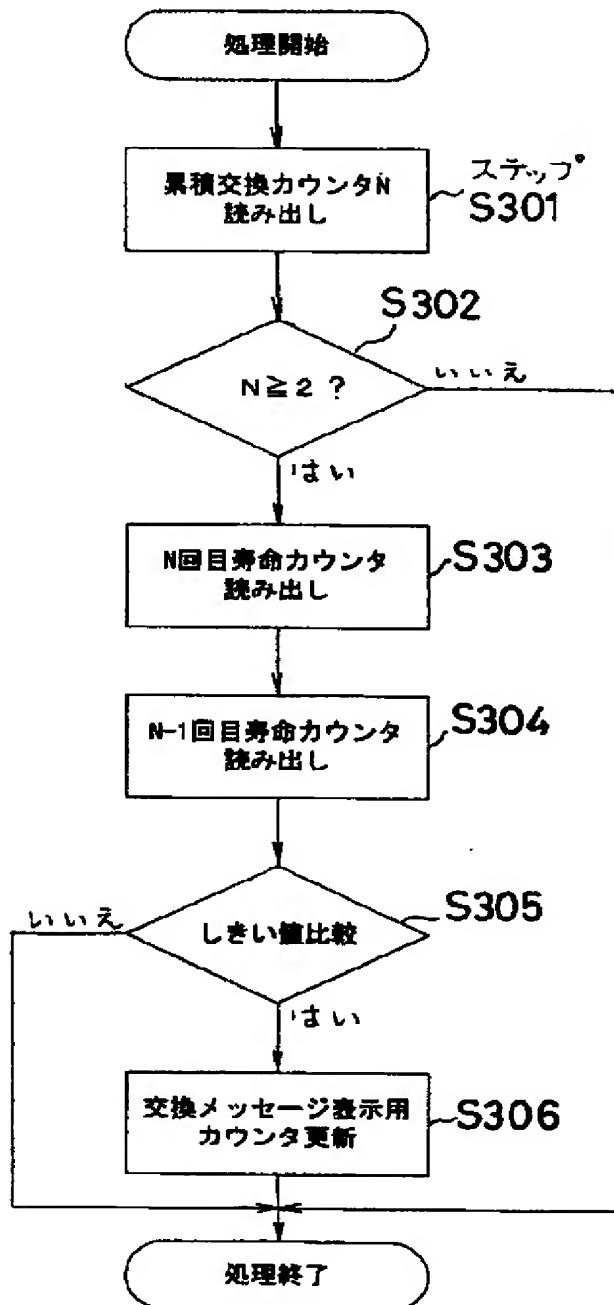
```
          ┌─────────────────┐
          │     処理開始      │
          └────────┬────────┘
                   │
          ┌────────┴────────┐
          │  累積交換カウンタN  │ ～ステップ
          │     読み出し      │   S301
          └────────┬────────┘
                   │     S302
                   ▽
              ／        ＼      いいえ
             ＜  N≧2？   ＞─────────────┐
              ＼        ／              │
                   │はい                │
          ┌────────┴────────┐           │
          │  N回目寿命カウンタ  │ S303      │
          │     読み出し      │           │
          └────────┬────────┘           │
                   │                    │
          ┌────────┴────────┐           │
          │ N-1回目寿命カウンタ │ S304      │
          │     読み出し      │           │
          └────────┬────────┘           │
                   │                    │
    いいえ      ／        ＼  S305         │
     ┌──────＜  しきい値比較  ＞           │
     │       ＼        ／              │
     │            │はい                │
     │   ┌────────┴────────┐           │
     │   │ 交換メッセージ表示用 │ S306      │
     │   │   カウンタ更新    │           │
     │   └────────┬────────┘           │
     │            │                    │
     └────────────┼────────────────────┘
          ┌────────┴────────┐
          │     処理終了      │
          └─────────────────┘
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CORRECTION OR AMENDMENT

[Kind of official gazette]Printing of amendment by regulation of Patent Law Article 17 of 2
[Section Type] The 2nd Type of the part VI gate
[Publication date]Heisei 15(2003) March 12 (2003.3.12)

[Publication No.]JP,11-327381,A
[Date of Publication]Heisei 11(1999) November 26 (1999.11.26)
[Annual volume number] Publication of patent applications 11-3274
[Application number]Japanese Patent Application No. 10-128750
[The 7th edition of International Patent Classification]

G03G 21/00 510

B41J 29/20

G03G 21/18
[FI]

G03G 21/00 510

B41J 29/20

G03G 15/00 556
[Written Amendment]
[Filing date]Heisei 14(2002) December 5 (2002.12.5)
[Amendment 1]
[Document to be Amended]Description
[Item(s) to be Amended]Title of invention
[Method of Amendment]Change
[Proposed Amendment]
[Title of the Invention]A recording medium which recorded a history recording device, a history record method, and a program and in which computer reading is possible
[Amendment 2]
[Document to be Amended]Description
[Item(s) to be Amended]Claims
[Method of Amendment]Change
[Proposed Amendment]
[Claim(s)]
[Claim 1]It is a history recording device which records an exchange history of said unit in a printer which can exchange units,
A history recording device having a control means controlled to make an exchange history of said unit record.
[Claim 2]The history recording device according to claim 1 which an exchange history of said unit is a count of a turnover rate, and is characterized by having the 1st update means that

updates a count of said turnover rate.
[Claim 3]The history recording device according to claim 1 having the 2nd update means that updates a life counter of a unit, and controlling said control means to make an exchange history of said unit record with a life counter corresponding to an exchanged unit according to having been exchanged in a unit.
[Claim 4]The history recording device according to claim 1 or 3 having the holding mechanism holding an exchange history of said unit, and controlling said control means to make an exchange history for newest prescribed frequency hold to said holding mechanism.